Testimony of

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Before the

House Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment Subcommittee

On

Thursday, March 19, 2009

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Chairwoman Johnson, Members of the Subcommittee:

Thank you for the chance to speak to you today. My name is Mary Wahl and I am the Director of Watershed Services, at the Bureau of Environmental Services representing the City of Portland, Oregon.

The Committee requested the City's perspective on the utility of green infrastructure for mitigating urban stormwater runoff, barriers to implementation, and recommendations for addressing the barriers. In this testimony, I will address these issues, and then add general comments on protecting water and urban watersheds.

1. What is the utility of green infrastructure in mitigating stormwater runoff?

a. Portland makes extensive use of green infrastructure because it works. Green infrastructure has developed to the point engineers now rely and design based on the performance of these facilities. We do not plan to build bigger and bigger pipe systems to manage added runoff as more growth and density occur, but ARE planning to manage that stormwater on site, at the surface, in vegetated facilities.

b. When costs for green infrastructure are close to the costs for grey (pipes) to achieve the same purpose, we opt for the green because they bring a number of environmental and other benefits in addition to the immediate objective.

Both of these are responses to the Clean Water Act. The one on the left is the $1.4 billion, 10 mile long tunnel built roughly 100 feet under ground to store enough water we don't overflow the combined storm/ sanitary lines when it rains. On the right is a curb extension, one of the green infrastructure facilities that will collectively manage the additional stormwater created as growth and in-fill occur.

c. An example of the utility of green infrastructure is that the first billion gallons of Combined Sewer Overflow ("CSO") control Portland has to generate each year comes from the 50,000 homeowners who disconnected their roof downspouts so they empty on the ground, not into the sewers. The utility of this solution is that it is better for the environment, it preserves pipe capacity, it is the least expensive per gallon stormwater control we have found, there are now neighborhoods where as high as 90% of the people are aware of the stormwater problem and of their contribution to the solution. An additional benefit is that the disconnects created ongoing work for small businesses.

d. The rain gutter disconnect example is very small scale individually, but stormwater runoff is a distributed problem, and the downspout disconnects are a distributed solution that work environmentally, economically, and as a business source. This experience is typical of the many ways these solutions have value.

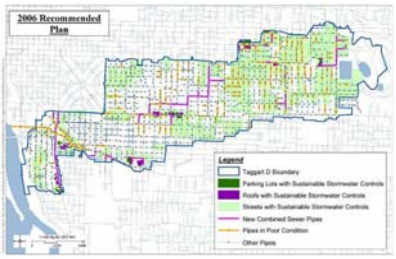
e. Curb extensions (pictured above) are a form of vegetated swales that can be sized to manage the amount of runoff coming to them. This curb extension manages the stormwater from ~1/4 acre. People living near these facilities appreciate them variously as stormwater facilities, as an excellent means of "traffic calming" in the neighborhood, or as a "street garden." Like the rain gutter disconnects, they seem small compared to the size of urban stormwater runoff. As noted above, though, the downspout disconnects by themselves now manage more than one billion of the annual 10 billion gallons of CSO flow Portland has to control. This program is estimated to have cost ~$225 million less than it would have cost for additional pipe capacity to manage the additional one billion gallons each year.

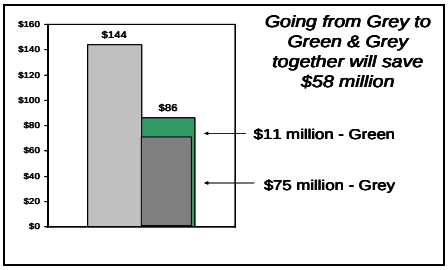
f. It is the job of the green infrastructure to manage both peak flows and flow volume so the flows don't surge into the pipes and cause basement backups or overflows to the rivers and streams. Our experience is that the curb extensions consistently reduce peak flows by ~80%. These facilities also need regularly reach annual levels of total volume reduction as high as 85%.

The green infrastructure facilities do their work, and achieve their multiple objectives by mimicking nature's approach.

g. Perhaps Portland's best example of the utility of green infrastructure is in a 1,400 block area of the City where the stormwater is combined with sanitary flows, and has until now created overflows to the Willamette River or backups to basements nearly every time it rained. Here, the City's planned solution in 2000 was an all-pipe solution, which costs $144 million. The current design takes the use of green infrastructure to unprecedented levels, using 600 green facilities and 4000 street trees in this single area, and

now costs $86 million. By first using the green facilities to manage as much stormwater as possible, then managing only the remainder with pipes, the total price dropped a remarkable $58 million, and the City gets the additional water quality, livability and urban tree canopy benefits these facilities deliver.



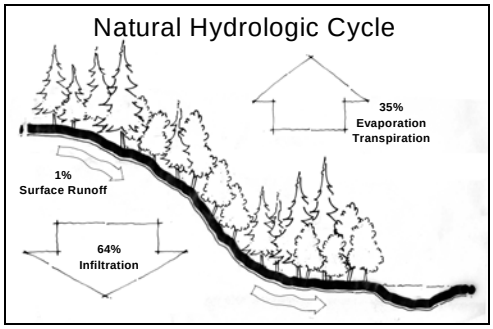


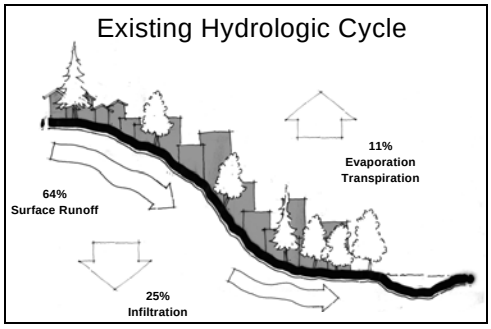
By spending $11 million on green infrastructure, then using pipes only for the remainder, the new integrated grey and green design met the original objectives and added many additional environmental outcomes, all for a price reduced by $58 million.

2. Four key barriers to the use of green infrastructure are listed here. Recommended solutions to these, based on Portland's experience, are in section #3 below.

a. Maintenance is often the first question asked by cities considering green infrastructure, in part because the nation's grey infrastructure has a maintenance backlog. Making the strategic shift to investments in green can be obscured by the maintenance concern.

b. **Regulatory acceptance**: When Portland began its CSO efforts in the 1990s, the City asked for an extension of the time to comply in exchange for implementing up to $90 million worth of green infrastructure. Since then, we have at least two examples of regulatory implementation supporting green infrastructure, but the typical regulatory demand --especially at the federal level-- is for piped responses, even when green infrastructure is proposed.





Stormwater runoff in natural conditions is roughly 1%. The rest goes into the soil or air, and slowly recharges streams and groundwater. As development occurs, more and more stormwater is immediately lost as runoff. Green infrastructure mimcs nature and helps restore the hydrologic cycle.

Water and watershed regulations, policy, and restoration efforts have focused primarily until now on water quality. Watershed science requires us to expand that focus to hydrology. That means we need to concentrate at least as much on where the water is, when it is there, and how much is there, as we do on water quality. The importance of actions that improve hydrology needs to be recognized in applying regulations. The green infrastructure is designed to address hydrology and flow in ways that mimic the natural system.

c. **Reliability:** These approaches are relatively new, particularly compared to the many decades collective experience we have with piped systems. The green technologies are judged based on achieving what pipes would otherwise be called on to achieve. With limited data, it has been difficult to gain acceptance of them as part of the long-term stormwater infrastructure.

d. **Funding and cost/ benefit ratio**: Funding is always a barrier for the green solutions, and so is the lack of good information about the economic and environmental value of the natural systems. Few people question how important the green systems are, but we have historically lacked cost/ benefit information on a par with that available about pipes, and when certainty is required, the call typically goes to pipes.

3. What are a few of Portland's recommendations to address the barriers?

a. **Implementation by the federal government**: Portland's experience is that the best route to overcoming several barriers described above is to learn through demonstration projects, then move to full implementation. Because green infrastructure has proven effective environmentally, economically, and in an engineering context, we have moved to the level of integrating hundreds of these facilities along with the conventional facilities. If the federal government called for green stormwater management facilities at the developments, roads, and buildings it funds, we would move rapidly beyond the demonstration phase, and the green economy would mature much faster.

Portland's response to the Clean Water Act included adopting a "Stormwater Management Manual" that requires all but the smallest developments – private or public – to manage stormwater at the source in vegetated, surface facilities, unless that is not feasible. Similarly, we have a "Green Street Policy" and a Council Resolution requiring all streets to manage stormwater in green facilities, and all City-funded roofs to be eco-roofs, unless those are not feasible. These policies have set the direction for Portland, and contributed in important ways to Portland now being a hub for the green economy. The federal government could do the same.

b. **Capitalize trees**: It is clear trees are critical assets, and a few jurisdictions have found ways to capitalize them. Until there is a broad, national interpretation that allows all jurisdictions to capitalize them, tree planting will rely on very limited operating dollars, or will occur only if they can be an incidental part of a capital project. Trees intercept rainfall, decreasing the speed and volume of stormwater runoff, they help move the stormwater to the ground so it is infiltrated rather than becoming runoff, and they improve stream temperatures and habitat. Encouraging investments in trees improves watershed health and can decrease the need for additional grey investments.

c. **Incentives**: Portland's green street and eco-roof programs have benefited over the past several years from EPA's "Wet Weather" grants that let us provide small incentives to innovative private and public developers of roads, building sites, eco-roofs, etc., to implement green and low impact approaches. These facilities helped move us to the point that the green solutions are generally the first ones analyzed for stormwater management.

d. **Quantify the benefits**: There is little disagreement about how important the green infrastructure is, but engineering, design, business, and – importantly – regulatory decision need to be based on a broadly accepted quantification of the benefits of trees, vegetated swales, habitat, eco-roofs, and wetlands. What is needed nationally is to quantify the benefits so regulatory decisions can be based on the information, and so the multiple benefits for water quality, habitat, fish recovery, and as an economic engine are available.

e. **Maintenance**: Decide the best strategic grey and green infrastructure investments based on environmental, economic, engineering and watershed factors, and then set maintenance levels across the entire system. This represents a shift away from avoiding green solutions because of the maintenance history for grey. The nation's crumbling water infrastructure is testimony to out-of-sight/ out-of-mind. Green infrastructure is on the surface and if it is well-designed, maintenance can be performed as a part of normal landscaping work.

Green Infrastructure Guiding Principles

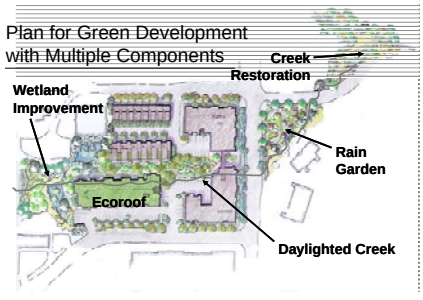
1. Preserve and maintain existing natural processes.
2. Manage stormwater runoff both at the source and on the surface.
3. Use plants and soil to slow, filter, cleanse, evapotranspirate, and infiltrate runoff.
4. Achieve other City goals.



GENERAL COMMENTS

Stormwater is a valuable resource, not a waste. Treating it as a waste is a very expensive operation, and losing the resource starves groundwater and surface water. Stormwater is the base flow for ground water and it recharges rivers and streams. Managing stormwater as a resource, particularly improving hydrology, provides multiple benefits, including habitat improvements and giving us a better chance of recovering fish populations.

Fortunately, managing stormwater more like nature does can achieve a great deal for people and cities, too. It can bring an economic boost and competitive edge, and it does terrific things for the environment. In the development pictured below, the buried stream was brought to the surface, which is good for the environment and adds a "marketable amenity" to the apartment complex. Our experience is that rents, and therefore property values, are higher when buildings are near facilities like the one on the right above, or near water. There are air quality, habitat and neighborhood enhancement benefits from developing with green infrastructure, along with the stormwater quality and hydrology benefits of these facilities.



This development, by using and restoring natural stormwater systems, is better for the environment, attracts tenants and better rents, and for this developer it brought publicity, design awards, and help from agencies. He is now involved in additional sustainable developments.

CONCLUSION

I appreciate the opportunity to be here, and would be happy to contribute to your efforts to address the barriers to implementing the green solutions. There is great potential for the environment, for communities, and for the economy through this approach and your work can help move us in that direction.

Thank you.

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